CALIFORNIA DEPARTMENT OF PUBLIC HEALTH
850 Marina Bay Parkway, Richmond, CA 94804

ENVIRONMENTAL MANAGEMENT BRANCH
Marine Biotoxin Monitoring Program

Monthly Marine Biotoxin Report

December 2012

Technical Report No. 12-26

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of December, 2012. Ranges of toxin concentrations are provided for the paralytic shellfish poisoning (PSP) toxins and for domoic acid (DA). Estimates are also provided for the distribution and relative abundance of *Alexandrium*, the dinoflagellate that produces PSP toxins, and *Pseudo-nitzschia*, the diatom that produces domoic acid. Summary information is also provided for any quarantine or health advisory that was in effect during the reporting period.

Please note the following conventions for the phytoplankton and shellfish biotoxin distribution maps: (i) All estimates for phytoplankton relative abundance are qualitative, based on sampling effort and percent composition; (ii) All toxin data are for mussel samples, unless otherwise noted; (iii) All samples are assayed for PSP toxins; DA analyses are performed as needed (i.e., on the basis of detected blooms of the diatoms that produce DA); (iv) Please refer to the appropriate figure key for an explanation of the symbols used on the maps.

Southern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was not observed at any sampling locations in December (Figure 1). PSP toxins were not detected in any shellfish samples collected throughout the month (Figure 3).

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Figure 1. Distribution of toxin-producing phytoplankton in Southern California during December, 2012.

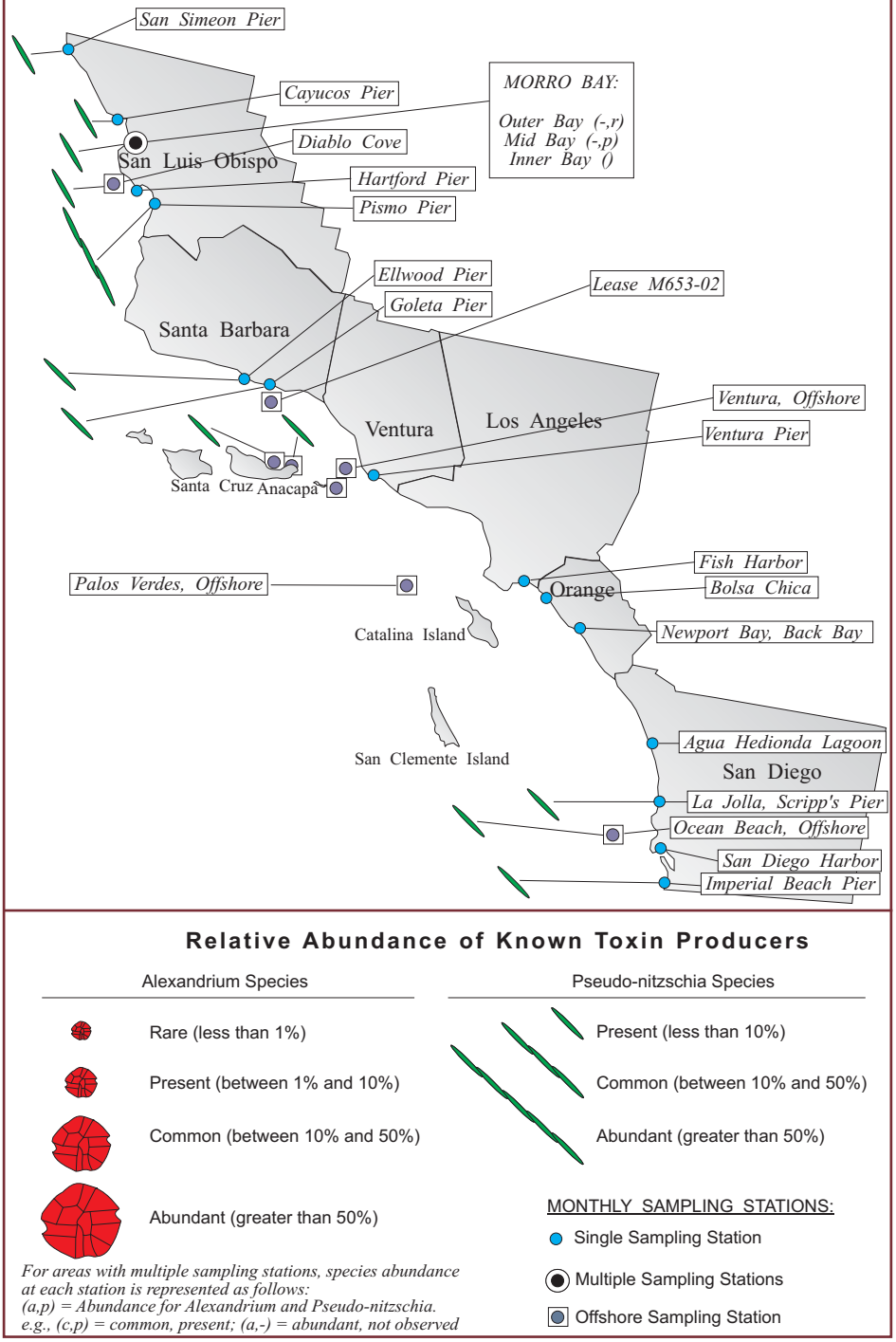
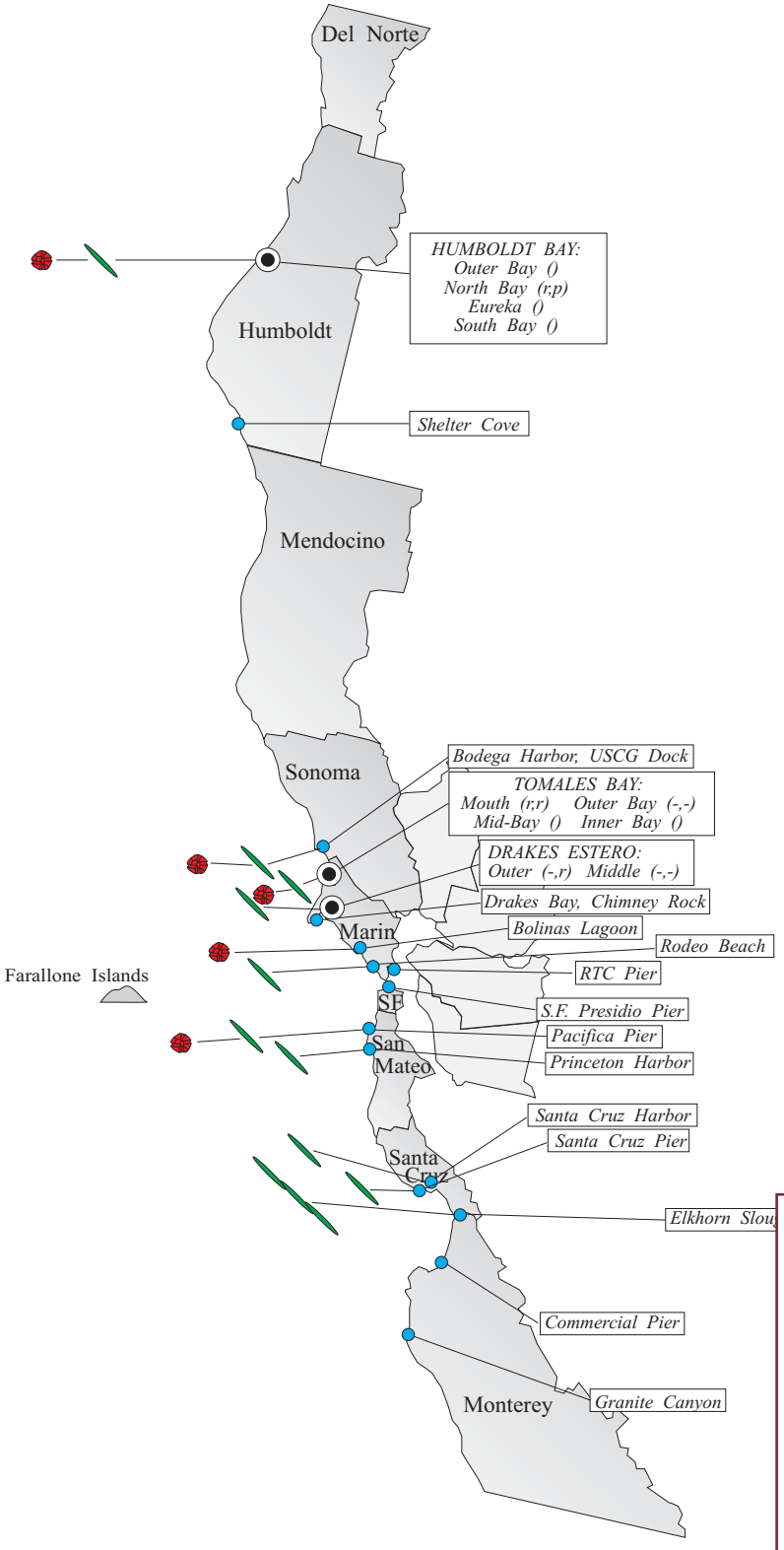


Figure 2. Distribution of toxin-producing phytoplankton in Northern California during December, 2012.



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Domoic Acid

Pseudo-nitzschia was observed along the entire southern California coast (Figure 1). The relative abundance of this diatom declined significantly in all regions, remaining common only at Pismo Pier (December 3).

The low levels of domoic acid detected in Morro Bay at the end of November declined below the detection limit by the beginning of December (Figure 3). High levels of this toxin (150 - 288 ppm) continue to be present in the viscera of rock crab from the northern Channel Island region. Lobster viscera from the same region contained lower concentrations of domoic acid (4 - 26 ppm).

Non-toxic Species

The diatom *Chaetoceros* was common along the Santa Barbara coast and offshore. Dinoflagellates were common elsewhere, with *Ceratium*, *Prorocentrum*, and *Lingulodinium* the most common species observed.

Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed between Marin and San Mateo counties, as well as in Humboldt Bay, in December (Figure 2). This represents a decline in distribution compared to observations in November. The relative

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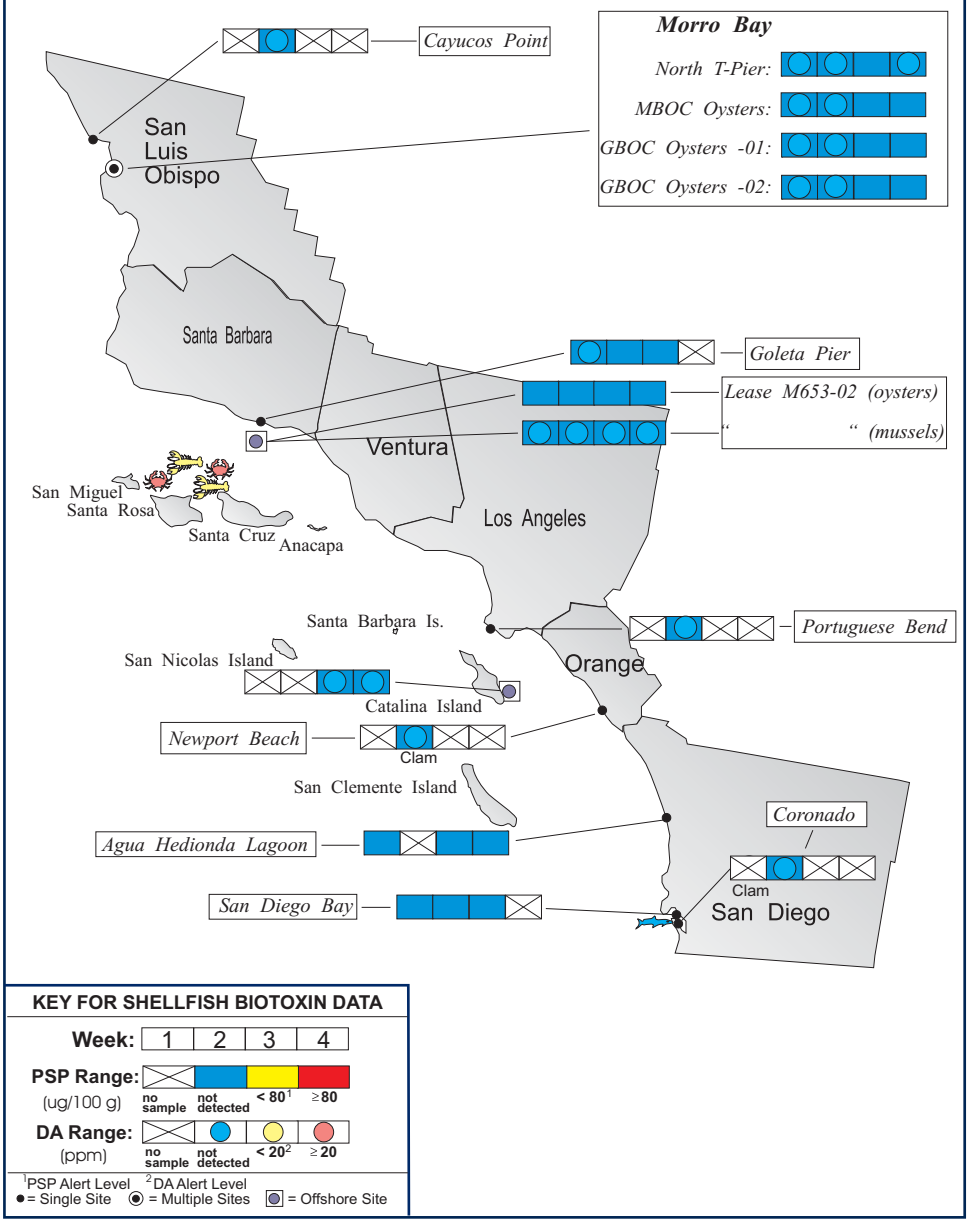
Figure 3. Distribution of shellfish biotoxins in Southern California during December, 2012.



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abundance of this dinoflagellate was low at all locations.

The high concentrations of PSP toxins detected in northern California in October and November declined at all locations in December (Figure 4). A follow-up mussel sample collected north of the Klamath River mouth in Del Norte County by the Yurok Tribe Environmental Program contained 179 ug/100g of the PSP toxins, a decline from 1763 ug/100 g of toxins detected on November 4. Low concentrations of PSP toxins continued to be present in mussels from Humboldt, Sonoma, and Marin counties, persisting through the end of the month in Humboldt Bay and Drakes Estero.

Domoic Acid

Pseudo-nitzschia was observed at several sampling sites in December (Figure 2). The distribution and relative abundance was greatly reduced from observations in November. Domoic acid was not detected in any shellfish samples analyzed in December (Figure 4).

Non-toxic Species

Cell numbers declined significantly in December. *Chaetoceros* and *Skeletonema* were common at singular sites in Marin and Sam Mateo, respectively. The dinoflagellate *Prorocentrum* was common to abundant at

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The Marine Biotoxin Monitoring and Control Program, managed by the California Department of Public Health, is a state-wide effort involving a consortium of volunteer participants. The shellfish sampling and analysis element of this program is intended to provide an early warning of shellfish toxicity by routinely assessing coastal resources for the presence of paralytic shellfish poisoning (PSP) toxins and domoic acid.

The Phytoplankton Monitoring Program is a state-wide effort designed to detect toxin producing species of phytoplankton in ocean water before they impact the public. The phytoplankton monitoring and observation effort can provide an advanced warning of a potential toxic bloom, allowing us to focus sampling efforts in the affected area before California's valuable shellfish resources or the public health is threatened.

For More Information Please Call:
(510) 412-4635

For Recorded Biotoxin Information Call:
(800) 553 - 4133

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sites in San Mateo and inside Monterey Bay at sites in Santa Cruz and Monterey.

QUARANTINES: The health advisory issued on November 6 for all bivalve shellfish in Del Norte County remained in effect in December. This action was taken because of the dangerous levels of PSP toxins detected and followed the extension of the annual mussel quarantine for Humboldt and Del Norte counties on October 31.

The health advisory issued on September 14 for the northern Channel Islands remained in effect. This alert was issued as a result of high levels of domoic acid in samples of crab viscera, also known as 'crab butter'. The advisory warned consumers to avoid eating bivalve shellfish or the internal organs of crab, lobster, and small finfish like sardines and anchovies from the affected region.

Consumers of Washington clams, also known as butter clams (*Saxidomus nuttalli*), are cautioned to eat only the white meat. Washington clams can concentrate the PSP toxins in the viscera and in the dark parts of the siphon and can remain toxic for a long period of time. Persons taking scallops or clams, with the exception of razor clams, are advised to remove and discard the dark parts (i.e., the digestive organs or viscera). Razor clams (*Siliqua patula*) are an exception to this general guidance due to their ability to concentrate and retain domoic acid in the edible white meat as well as in the viscera.

PSP toxins affect the human central nervous system, producing a tingling around the mouth and fingertips within a few minutes to a few hours after eating

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Figure 4. Distribution of shellfish biotoxins in Northern California during December, 2012.

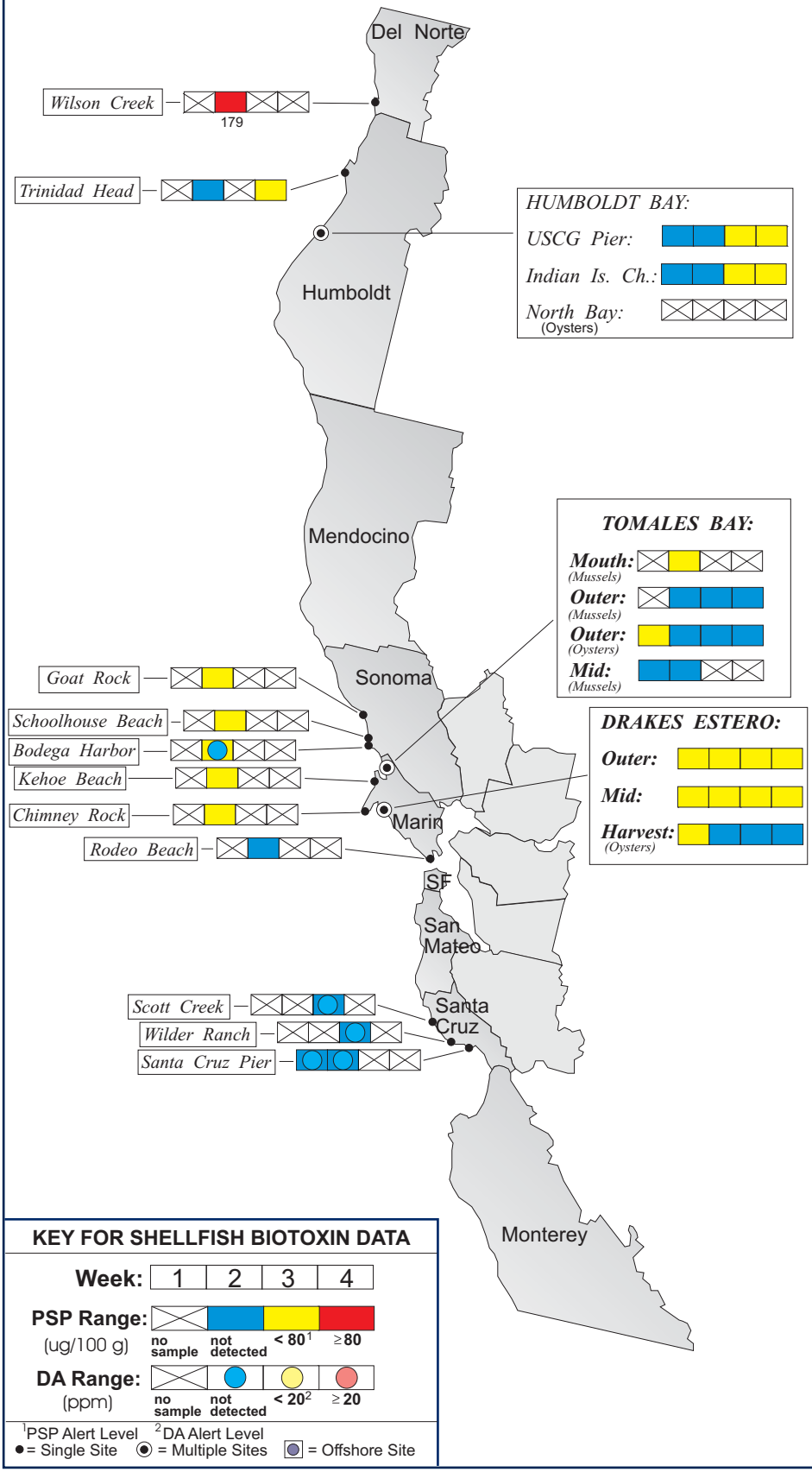

Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during December, 2012.

COUNTY	AGENCY	#
Del Norte	Yurok Tribe Environmental Program	2
Humboldt	Coast Seafood Company	8
	Humboldt County Environmental Health Department	1
Mendocino	None Submitted	
Sonoma	CDPH Marine Biotoxin Program	3
Marin	Cove Mussel Company	2
	Drakes Bay Oyster Company	18
	Hog Island Oyster Company	3
	Marin Oyster Company	5
	CDPH Marine Biotoxin Program	4
	CDPH Volunteer (*Peter Schmidt*)	1
San Francisco	None Submitted	
San Mateo	None Submitted	
Santa Cruz	U.C. Santa Cruz	2
	CDPH Volunteer (*Devon Padilla*)	2
Monterey	None Submitted	
San Luis Obispo	Grassy Bar Oyster Co.	10
	Morro Bay Oyster Company	6
	CDPH Volunteer (*Otto Schmidt*)	
Santa Barbara	Santa Barbara Mariculture Company	10
	U.C. Santa Barbara	9
	HABNet	9
Ventura	None Submitted	
Los Angeles	Los Angeles County Health Department	1
Orange	CDPH Volunteer (*Steve Crooke*)	1
San Diego	Carlsbad Aquafarms, Inc.	3
	CDPH Volunteer (*Steve Crooke*)	1
	U.S. Navy Marine Mammal Program	6

Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during December, 2012.

COUNTY	AGENCY	#
Del Norte	None Submitted	
Humboldt	Coast Seafood Company	4
	Bureau of Land Management	2
Mendocino	None Submitted	
Sonoma	CDPH Marine Biotoxin Program	1

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toxic shellfish. These symptoms typically are followed by disturbed balance, lack of muscular coordination, slurred speech and difficulty swallowing. In severe poisonings, complete muscular paralysis and death from asphyxiation can occur.

Symptoms of domoic acid poisoning can occur within 30 minutes to 24 hours after eating toxic seafood. In mild cases, symptoms of exposure to this nerve toxin may include vomiting, diarrhea, abdominal cramps, headache and dizziness. These symptoms disappear completely within several days. In severe cases, the victim may experience excessive bronchial secretions, difficulty breathing, confusion, disorientation, cardiovascular instability, seizures, permanent loss of short-term memory, coma and death.

Any person experiencing any of these symptoms should seek immediate medical care. Consumers are also advised that neither cooking or freezing eliminates domoic acid or the PSP toxins from the shellfish tissue. These toxins may also accumulate in the viscera of seafood species such as crab, lobster, and small finfish like sardines and anchovies, therefore these tissues should not be consumed. Contact the "Biotoxin Information Line" at 1-800-553-4133 for a current update on marine biotoxin activity prior to gathering and consuming shellfish.

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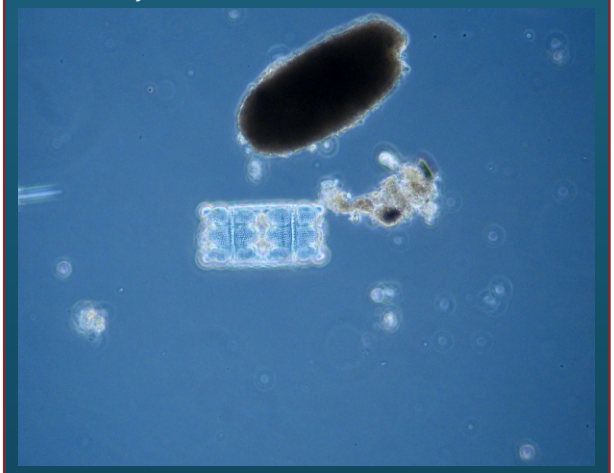
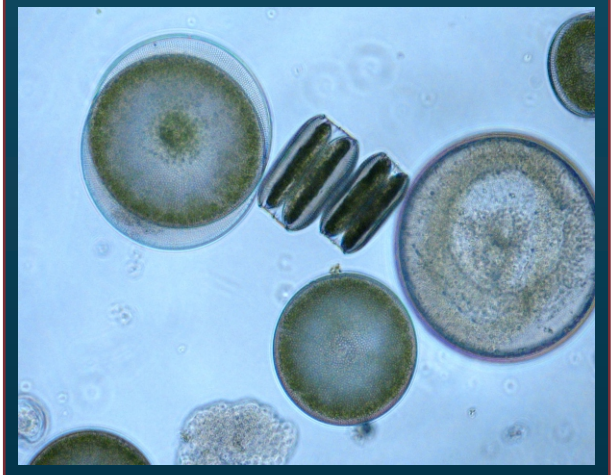
Marin	Drakes Bay Oyster Company	11
	CDPH Volunteer (*Brent Anderson*)	3
	SFSU, Romberg Tiburon Center	3
	CDPH Marine Biotoxin Program	2
	Hog Island Oyster Company	1
	Golden Gate National Recreation Area	1
Contra Costa	None Submitted	
Alameda	None Submitted	
San Francisco	CDPH Volunteer (*Eugenia McNaughton*)	2
San Mateo	The Marine Mammal Center (*Stan Jensen*)	4
	CDPH Volunteer (*Aric Bickel*)	3
	U.C. Santa Cruz	1
Santa Cruz	San Lorenzo Valley High School	1
	U.C. Santa Cruz	3
Monterey	Friends of the Sea Otter (*Janis Chaffin*)	4
	Monterey Abalone Company	2
	Marine Pollution Studies Laboratory	2
San Luis Obispo	Friends of the Sea Otter (*Kelly Cherry*)	5
	Grassy Bar Oyster Company	4
	Morro Bay National Estuary Program	2
	Monterey Bay National Marine Sanctuary	2
	Tenera Environmental	3
	The Marine Mammal Center (*P.J. Webb, Tim Lytsell*)	2
Santa Barbara	CDPH Volunteer (*Sylvia Short*)	4
	Santa Barbara Mariculture Company	1
	U.C. Santa Barbara	3
	Island Packers/HABNet	3
	National Park Service	1
Ventura	CDPH Volunteer (*Fred Burgess*)	3
	Channel Island National Marine Sanctuary	1
	National Park Service	1
Los Angeles	Los Angeles County Sanitation District	2
	Southern California Marine Institute	1
Orange	Amigos de Bolsa Chica	1
	California Department of Fish and Game	2
San Diego	Carlsbad Aquafarms, Inc.	1
	San Diego Whale Watch	2
	Scripps Institute of Oceanography	5
	Tijuana River National Estuary Research Reserve	4
	U.S. Navy Marine Mammal Program	1

PHYTOPLANKTON GALLERY

There are many species of the diatom Chaetoceros along the coast, some with extremely long silica spines radiating from the cell junctions.



One of many different species of the diatom Odontella observed along the California coast.



Two views of a centric diatom, illustrating the 'pillbox' structure of the cell.